STATE ADVISORY COUNCIL ON SCIENCE AND TECHNOLOGY
M I N U T E S

Tuesday, June 6, 2000
3:00 - 4:30 p.m.
State Capitol, Room 223
Salt Lake City

MEMBERS & ASSOCIATE MEMBERS PRESENT:

SAUER, Dennis Alliant Techsystems, Inc.
JOHNSON, Susan Futura Industries
TAKACH, Troy Parvus Corporation
ORD, Virginia Davis School District
HOOPER, Gary Brigham Young University
GERITY, Peter Utah State University
BREHM, Michael Brehm Engineering LLC
LUND, Gary Thiokol Corporation
WORKMAN, Dave Salt Lake Olympic Com. (Representing Diane Conrad)

MEMBERS ABSENT OR EXCUSED:

KOEHN, Richard University of Utah
CONRAD, Diane Salt Lake Olympic Com.
DOENGES, Peter Evans and Sutherland, Corp

OTHERS PRESENT:

LOWE, Mike UT Geological Survey
CHATWIN, Terry University of Utah
BITTER, LeGrand Wasatch Energy Systems
MORRIS, Nal Parowan Gap
MORRIS, Lowell Parowan Gap
MORRIS, Rolean Parowan Gap
MORRIS, Bonnie L. Parowan Gap
MORRIS, Nowell Parowan Gap
LEE, Ron Parowan Gap
BAUER, Danny State Science Advisor
WALTERS, Clara GOPB

I. Call to Order/Introductions/Approval of Minutes

Susan Johnson, the newly installed Chairman, called the meeting to order at 3:00 p.m. A motion was made accept the minutes of the March 7, 2000 meeting as written. Voting was unanimous in favor of the motion.

II. Discussion of Science Advisor Interim Position - Dan Bauer

Danny Bauer, the Interim Science Advisor announced that Suzanne Winters would be returning to her position as State Science Advisor on September 1, 2000.

III. Presentation, Parowan Gap - Nal Morris, Researcher

The Parowan Gap is a canyon or pass running west by northwest through the Red Hills Range of southwestern Utah. This is a small range that separates Parowan Valley from the Escalante Desert to the west. The Gap consists of a winding canyon that opens into a valley about three quarters of a mile in diameter surrounded on all sides by low lying mountains. West by Northwest is a severe, narrow and abrupt split or gap in the mountains. This is called the Narrows of Parowan Gap, the site of many Indian petroglyphic writings. The environment is arid and the wash beds are dry most of the year. With the exception of the petroglyphic writings there are very few signs remaining of prehistoric habitation at the site.

The earliest know historical record of the petroglyph writings is found in a journal by Robert Campbell and in 1849 Parley P. Pratt led an expedition from the north into what is now the Parowan Valley to explore the area and make the first settlements. From Parowan they made exploratory excursions in the surrounding mountain and canyons. It was then the petroglyphic inscriptions were found.

The gap became an access route for the white settlers as it had been for the Indian people.

There was an additional feature to the west that was important to Indians and early white settlers. Rush Lake, a large shallow and marshy lake is about five miles south of the west entrance of the narrows. There was good hunting for water fowl and small aquatic animals along with plentiful spring that flowed from a large lava hill into the lake.

Stone quarrying was done at the narrows and prior to 1963 the road was one lane wide. As improvements were made for better access, the large stones at the narrows were moved. One stone in particular was covered with glyphs and known as the "Hotel". This rock was blasted as were others and the gap became what we see today. There may be as little as one-half of the cultural information remaining that was available when the Parley Pratt expedition first visited the site.

The Fremont devised a calender by the division of the half year between the solstices into four equal divisions of 45 days each. This required a definable and measurable concept of time which necessitated numerical methods no matter how rudimentary. By investigating the occurrence of number, space (the local topography) and light (the motion of the sun), an explanation of how these people understood time is rendered at the gap. Mr. Norris regards the principal glyphs at Parowan Gap to be Fremont based on style and technical skill with number and astronomy. When comparing the Zipper Glyph with a glyph found at Sears Point, Arizona, one finds they both have a characteristic lobed "V" shape. There are numerous glyphs of this style found around the west.

At Parowan Gap it could be said that summer solstice is the main event. This is the day the sun shines squarely down the axis of the narrows and it's from this event the solar calendar the zipper glyph, derives its form and function. As the light of the setting sun shines through the Gap narrows, it slices the space of the valley east of the narrows into wedges. These wedges are sectors of the sun's seasonal angular traverse, but they are also slices of time dividing the time between the solstices into smaller, more useful and manageable periods. The setting sun projects a knife or arrow point of light on to the hills behind the narrows. These pints of light turn into shafts of light around the summer solstice at about the time of the May-August cross quarters. These points or shafts of light are visible at any clear sunset any time during the year. There also consists a series of cairns, which are places to stand for observation of sunsets and sunrises through the narrows. From these cairns the site's creators understood all they needed to know about setting up the calendar by using light.

At the east entrance to the gap narrows are two small caves. Both caves contain glyphs. Both look as though they were habitation sites with the ceilings blackened with soot from fires or torches. The larger cave has had some pot hunting and vandalism, but has now been archaeologically excavated. Carbon dates from 3000 to 400 BC has allowed a history of the site occupation and utilization to be developed.

Local residents report many prehistoric habitation sites up and down the Parowan Valley. Many of them have lost due to development, but archaeological excavation has been done at Median Village, Evans Mound and Paragonah Mound. These sites are east of Parowan Gap in Parowan Valley. Evans Mound and Median Village are close to Summit just south of Parowan City. Paragonah Mound is in Parogonah north of Parowan City. Artifact from these sites and others has been sufficient to identify a local Fremont variant called the Parowan Fremont.

The calendar found at Parowan Gap is actually a complimentary tool in the daily activity of these people. While their calendar was important it nevertheless was only to augment and a scheduler of, the subsistence activities. The people of Median Village and Evans Mound were both hunter-gatherers and cultivators of corn and squash. It is not know what percentage of their subsistence came from these sources, but whatever the apportionment may have been they were vitally dependent on their understanding of the calendar.

Petroglyphs attributed to the Fremont culture affirm strong evidence that the Fremont people understood and used number extensively. Nearly all the glyphs at Parowan Gap Narrows show an overwhelming use of numbers. These people had achieved representation by number. The system used at Parowan Gap is called isomorphic. This means that one tick mark, dot, or enclosed square corresponds to one other item, a day, person or year on a one for one basis. This is not like our numbers. We represent seven as "7", "VII", or "seven", but in an isomorphic system seven is represented as ******* or /////// that is by the simple seven repetitions of a graphic element. It is the number of repetitions of a glyptic element and not the elements themselves that convey meaning. The above information is to demonstrate that isomorphic number is native to all peoples.

It should therefore conclude that the tick marks, lines and dots incorporated into the glyphs at Parowan Gap and many other sites can indeed be numeric values that signify meaning. The proof of number is dependent on their consistency with dates, alignments, topography and glyptic form.

The value of Parowan Gap is in its representation of an early culture's use of a calendar. It is one of the best example of ancient archaeo-astronomical sites in the world. However, due to the location and easy accessability of the site, vandalism and development has become a major threat to the continued existence of the site at Parowan Gap.

To this end, Iron County, the City of Parowan and Mr. Norris have combined to preserve the site. A project to preserve and enhance the site was begun and The Archaeoastronomy Reports Volumes I (pertaining to the research at the Gap), Volume II (pertaining to supporting research at remote sites) and Volume III (the field notes) are part of the project. Parowan City and Iron County's purpose in instigating the project was to enhance the travelers experience. The Federal Highways Administration has supplied matching funds for this purpose. The Project coordinators are now in the process of enlightening the citizens of the area and the State to Parowan Gap's ancient history.

In spite of all the work that has been done there is still much more yet to do. This is true for both the Gap in particular and also for all the related and supporting sites. This work must be done to further broaden our understanding of the rock art and Archaeo-astronomy in Utah.

Action Items: Sue Johnson, Danny Bauer and Suzanne Winters will assist Mr. Morris is writing an Executive Summary for the report. Mr. Morris will then report to the Council at the September meeting.

IV. Presentation on the Davis County Incinerator - LeGrand Bitter

Most of us are familiar with solid waste. It is something that is created in every home, business and district. Wasatch Energy Systems was created in 1984 with the assistance of the Wasatch Front Regional Council, the elected officials determined they would build as part of a regional solid waste management system, a waste energy facility that would work with the landfill as well as the other components of waste management system.

We serve Weber, Davis and Morgan Counties with the exception of Bountiful City. This consists of 50,000 households and over 250,000 citizens dealing with disposal of residential as well as commercial waste.

The EPA defines an integrated solid waste management system as one that utilizes several alternative methods for processing solid waste. Those alternatives include source reduction, recycling, composting, waste-to-energy and landfilling. Each one of these system is a filter for the waste.

Today, much of our trash lives a second life. Ten years ago, America recycled 10 percent of the materials in its trash and recovered energy (thermal recycling) from only two percent. Today the combination of recycling alternatives results in 43 percent of our trash being reused. Two years ago Wasatch Energy installed a liner system at a cost of $4 Million and covers approximately 15 acres. It consists of a storm water control system, a leaching collection system and a triple lined leaching collection pond for leach detection of waste. Not all systems are lined. At present there are only about 5 lined systems in the state.

Over 400 tons of refuse are delivered to Wasatch Energy Systems daily and we process about 135,000 tons of solid waste per year. The waste is reduced in volume by 90%. The ash produced is an inert ash. It is not hazardous and is tested on an ongoing basis. It is recycled and used in road base and various concrete products. Wasatch Energy Systems is equipped with Continuous Emissions Monitors (CEM) for the purpose of evaluating plant emissions. Modern waste-to-energy technology improves the quality of our environment by displacing a variety of air and water pollution sources.

The National Energy Policy Act of 1992 calls for greater use of trash for energy to help reduce greenhouse gas buildup. The U.S. Department of Energy estimates that waste-to-energy technology will be one of the four largest contributors to America's planned carbon dioxide reductions for the year 2000, accounting for 15 percent of the total.

We view waste energy as a net pollution reducer. In an industrial landfill waste decomposes and generates "landfill gas" such as methane and other types of compounds. Our waste energy plant has displaced landfill gas emissions by 130,000 tons of raw garbage every year. We sell 500 million pounds of steam per year to Hill Air Force Base and their fossil fuel boilers do not have to fire up and emit emissions into the atmosphere as a result of receiving steam from our facility.

We are in compliance with all Federal Law. The only Federal Law that applies to us today is "particulate emissions". Our approval order with the State goes far beyond that. We are regulated for Nox doxins/furans, heavy metals, HCL, SO^2, CO and controlled Particulate Opacity as well. The state approval order goes beyond what Federal Law requires. We have been waiting since 1990 for EPA to issue new rules for waste energy facilities of our size. They did that in 1994 and in 1995 those rules were thrown out because they went beyond the requirements of Federal Law and since that time EPA has promulgated new rules. They came out with a draft rule last August and it has gone out for public comment. We are comfortable that those limits will not change and if they do it will not be material. Since August we have been designing a system that will meet those new limits. We will be several years ahead of EPA's propagated rules and will have our system in place anywhere from 3 to 5 years ahead of EPA's final requirement.

We are in compliance with al the State regulations on an operating basis and we are installing an air pollution control system. Our objective is to manage solid waste in an environmentally sound fashion. Our energy recovery facility is a net pollution reducer

and the new air quality retro-fit will result in our facility being one of the cleanest in the world.

V. Update on Tooele Chemical Agent Incinerator Agent Release - Dan Bauer

Final reports have not been released to date, so Dan will respond on this at the September meeting.

VI. Other

This meeting is Virginia Ord's last one as a member of the Council. She has submitted her replacement's name to Danny.

VI. Adjourn

The meeting was adjourned at 5:00 p.m.